

# DALLAS

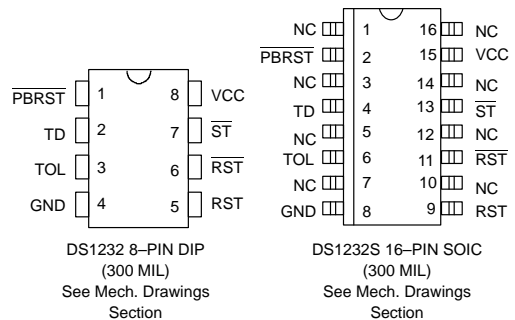
SEMICONDUCTOR

## DS1232 MicroMonitor Chip

### FEATURES

- Halts and restarts an out-of-control microprocessor
- Holds microprocessor in check during power transients
- Automatically restarts microprocessor after power failure
- Monitors pushbutton for external override
- Accurate 5% or 10% microprocessor power supply monitoring
- Eliminates the need for discrete components
- Space-saving, 8-pin mini-DIP
- Optional 16-pin SOIC surface mount package
- Industrial temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  available, designated N

### PIN ASSIGNMENT



### PIN DESCRIPTION

PBRST	– Pushbutton Reset Input
TD	– Time Delay Set
TOL	– Selects 5% or 10% $V_{CC}$ Detect
GND	– Ground
RST	– Reset Output (Active High)
RST	– Reset Output (Active Low, open drain)
ST	– Strobe Input
$V_{CC}$	– +5 Volt Power
NC	– No Connections

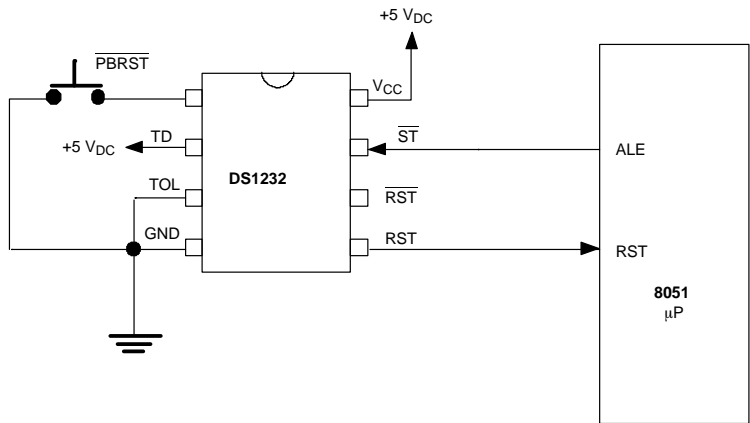
### DESCRIPTION

The DS1232 MicroMonitor Chip monitors three vital conditions for a microprocessor: power supply, software execution, and external override. First, a precision temperature-compensated reference and comparator circuit monitors the status of  $V_{CC}$ . When an out-of-tolerance condition occurs, an internal power fail signal is generated which forces reset to the active state. When  $V_{CC}$  returns to an in-tolerance condition, the reset signals are kept in the active state for a minimum of 250 ms to allow the power supply and processor to stabilize.

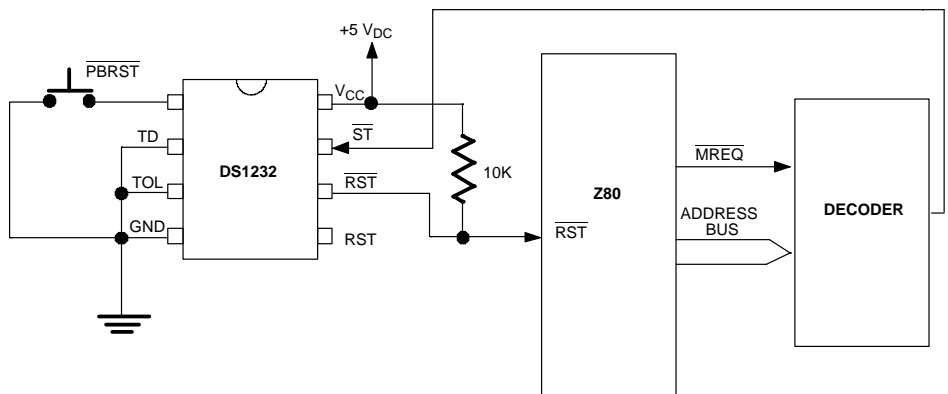
The second function the DS1232 performs is pushbutton reset control. The DS1232 debounces the pushbutton input and guarantees an active reset pulse width of 250 ms minimum. The third function is a watchdog timer. The DS1232 has an internal timer that forces the reset signals to the active state if the strobe input is not driven low prior to time-out. The watchdog timer function can be set to operate on time-out settings of approximately 150 ms, 600 ms, and 1.2 seconds.



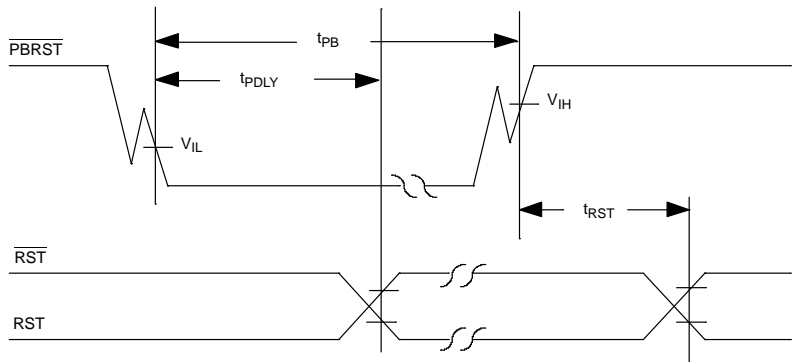
**PUSHBUTTON RESET** Figure 2



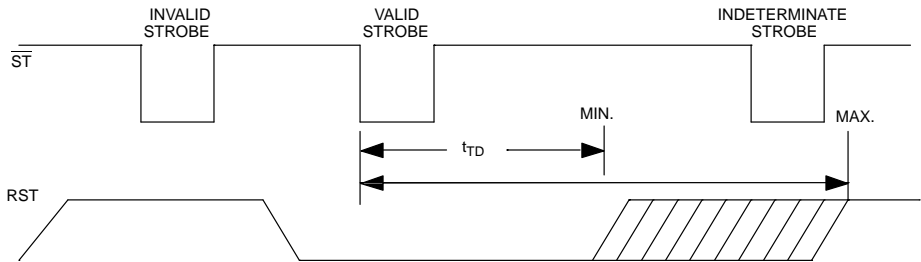
**WATCHDOG TIMER** Figure 3



**TIMING DIAGRAM: PUSHBUTTON RESET** Figure 4



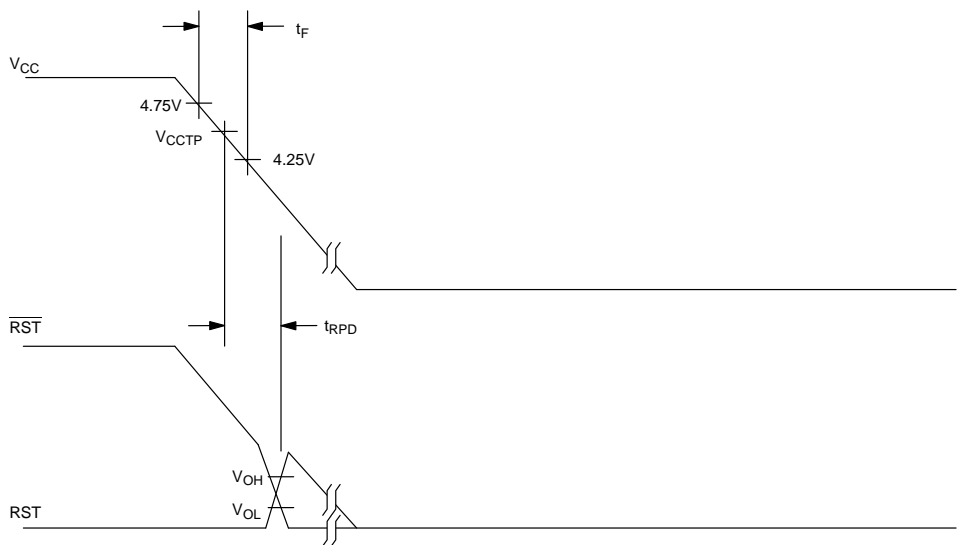
**TIMING DIAGRAM: STROBE INPUT** Figure 5



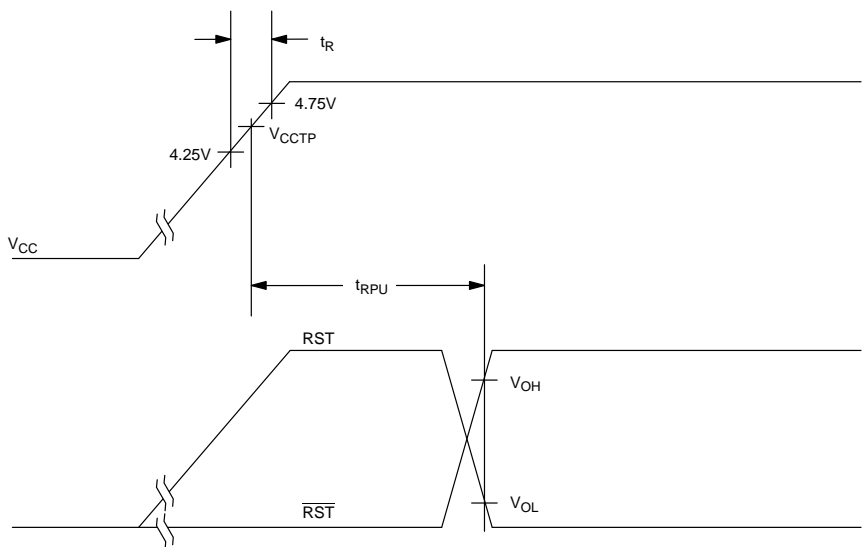
**WATCHDOG TIMEOUTS** Table 1

TD PIN	TIME-OUT		
	MIN	TYP	MAX
GND	62.5 ms	150 ms	250 ms
Float	250 ms	600 ms	1000 ms
V <sub>CC</sub>	500 ms	1200 ms	2000 ms

**TIMING DIAGRAM: POWER DOWN** Figure 6



**TIMING DIAGRAM: POWER UP** Figure 7



**ABSOLUTE MAXIMUM RATINGS\***

Voltage on $V_{CC}$ Pin Relative to Ground	-0.5V to +7.0V
Voltage on I/O Relative to Ground	-0.5V to $V_{CC} + 0.5V$
Operating Temperature	0°C to 70°C
Operating Temperature (Industrial Version)	-40°C to +85°C
Storage Temperature	-55°C to +125°C
Soldering Temperature	260°C for 10 seconds

\* This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

**RECOMMENDED DC OPERATING CONDITIONS**

(0°C to 70°C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Voltage	$V_{CC}$	4.5	5.0	5.5	V	1
$\overline{ST}$ and $\overline{PBRST}$ Input High Level	$V_{IH}$	2.0		$V_{CC}+0.3$	V	1
$\overline{ST}$ and $\overline{PBRST}$ Input Low Level	$V_{IL}$	-0.3		+0.8	V	1

**DC ELECTRICAL CHARACTERISTICS**(0°C to 70°C;  $V_{CC} = 4.5$  to 5.5V)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Input Leakage	$I_{IL}$	-1.0		+1.0	$\mu A$	3
Output Current @ 2.4V	$I_{OH}$	-8	-10		mA	5
Output Current @ 0.4V	$I_{OL}$	8	10		mA	
Low Level @ RST	$V_{OL}$			0.4	V	1
Output Voltage @ -500 $\mu A$	$V_{OH}$	$V_{CC}-0.5V$	$V_{CC}-0.1V$		V	1, 7
Operating Current	$I_{CC}$		0.5	2.0	mA	2
$V_{CC}$ Trip Point (TOL = GND)	$V_{CCTP}$	4.50	4.62	4.74	V	1
$V_{CC}$ Trip Point (TOL = $V_{CC}$ )	$V_{CCTP}$	4.25	4.37	4.49	V	1

**CAPACITANCE**(t<sub>A</sub> = 25°C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Input Capacitance	$C_{IN}$			5	pF	
Output Capacitance	$C_{OUT}$			7	pF	

**AC ELECTRICAL CHARACTERISTICS**(0°C to 70°C;  $V_{CC} = 5V \pm 10\%$ )

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
$\overline{PBRST} = V_{IL}$	$t_{PB}$	20			ms	
RESET Active Time	$t_{RST}$	250	610	1000	ms	
$\overline{ST}$ Pulse Width	$t_{ST}$	20			ns	6, 8
$V_{CC}$ Fail Detect to RST and $\overline{RST}$	$t_{RPD}$		100	175	$\mu s$	
$V_{CC}$ Slew Rate 4.75V to 4.25V	$t_F$	300			$\mu s$	
$V_{CC}$ Detect to RST and $\overline{RST}$ Transition	$t_{RPU}$	250	610	1000	ms	4
$V_{CC}$ Slew Rate 4.25V to 4.75V	$t_R$	0	5		$\mu s$	
$\overline{PBRST}$ Stable Low to RST and $\overline{RST}$	$t_{PDLY}$			20	ms	

**NOTES:**

1. All voltages referenced to ground.
2. Measured with outputs open.
3.  $\overline{PBRST}$  is internally pulled up to  $V_{CC}$  with an internal impedance of 10K typical.
4.  $t_R = 5 \mu s$ .
5.  $\overline{RST}$  is an open drain output.
6. Must not exceed  $t_{TD}$  minimum. See Table 1.
7. RST remains within 0.5V of  $V_{CC}$  on power-down until  $V_{CC}$  drops below 2.0V.  $\overline{RST}$  remains within 0.5V of GND on power-down until  $V_{CC}$  drops below 2.0V.
8. Watchdog can not be disabled. It must be strobed to avoid resets.